

# Table of Contents

<b>ACKNOWLEDGMENTS</b>	<b>I</b>
<b>TABLE OF CONTENTS</b>	<b>III</b>
<b>LIST OF TABLES, FIGURES, AND BOXES</b>	<b>VI</b>
Tables	vi
Figures	vi
Boxes	xvi
<b>EXECUTIVE SUMMARY</b>	<b>ES-1</b>
ES.1. Background Information	ES-2
ES.2. Recent Trends in U.S. Greenhouse Gas Emissions and Sinks	ES-4
ES.3. Overview of Sector Emissions and Trends	ES-10
ES.4. Other Information	ES-13
<b>1. INTRODUCTION</b>	<b>1-1</b>
1.1. Background Information	1-2
1.2. Institutional Arrangements	1-8
1.3. Inventory Process	1-9
1.4. Methodology and Data Sources	1-11
1.5. Key Categories	1-11
1.6. Quality Assurance and Quality Control (QA/QC)	1-14
1.7. Uncertainty Analysis of Emission Estimates	1-15
1.8. Completeness	1-16
1.9. Organization of Report	1-16
<b>2. TRENDS IN GREENHOUSE GAS EMISSIONS</b>	<b>2-1</b>
2.1. Recent Trends in U.S. Greenhouse Gas Emissions	2-1
2.2. Emissions by Economic Sector	2-22
2.3. Indirect Greenhouse Gas Emissions (CO, NO <sub>x</sub> , NMVOCs, and SO <sub>2</sub> )	2-29
<b>3. ENERGY</b>	<b>3-1</b>
3.1. Carbon Dioxide Emissions from Fossil Fuel Combustion (IPCC Source Category 1A)	3-2
3.2. Carbon Emitted from Non-Energy Uses of Fossil Fuels (IPCC Source Category 1A)	3-19
3.3. Stationary Combustion (excluding CO <sub>2</sub> ) (IPCC Source Category 1A)	3-24
3.4. Mobile Combustion (excluding CO <sub>2</sub> ) (IPCC Source Category 1A)	3-31
3.5. Coal Mining (IPCC Source Category 1B1a)	3-39
3.6. Abandoned Underground Coal Mines (IPCC Source Category 1B1a)	3-42
3.7. Petroleum Systems (IPCC Source Category 1B2a)	3-46

3.8.	Natural Gas Systems (IPCC Source Category 1B2b)	3-50
3.9.	Municipal Solid Waste Combustion (IPCC Source Category 1A5)	3-53
3.10.	Natural Gas Flaring and Indirect Greenhouse Gas Emissions from Oil and Gas Activities (IPCC Source Category 1B2)	3-58
3.11.	International Bunker Fuels (IPCC Source Category 1: Memo Items)	3-60
3.12.	Wood Biomass and Ethanol Consumption (IPCC Source Category 1A)	3-65
<b>4.</b>	<b>INDUSTRIAL PROCESSES</b>	<b>4-1</b>
4.1.	Iron and Steel Production (IPCC Source Category 2C1)	4-4
4.2.	Cement Manufacture (IPCC Source Category 2A1)	4-7
4.3.	Ammonia Manufacture and Urea Application (IPCC Source Category 2B1)	4-10
4.4.	Lime Manufacture (IPCC Source Category 2A2)	4-14
4.5.	Limestone and Dolomite Use (IPCC Source Category 2A3)	4-18
4.6.	Soda Ash Manufacture and Consumption (IPCC Source Category 2A4)	4-21
4.7.	Titanium Dioxide Production (IPCC Source Category 2B5)	4-24
4.8.	Phosphoric Acid Production (IPCC Source Category 2A7)	4-26
4.9.	Ferroalloy Production (IPCC Source Category 2C2)	4-29
4.10.	Carbon Dioxide Consumption (IPCC Source Category 2B5)	4-31
4.11.	Zinc Production	4-35
4.12.	Lead Production	4-38
4.13.	Petrochemical Production (IPCC Source Category 2B5)	4-39
4.14.	Silicon Carbide Production (IPCC Source Category 2B4) and Consumption	4-42
4.15.	Nitric Acid Production (IPCC Source Category 2B2)	4-44
4.16.	Adipic Acid Production (IPCC Source Category 2B3)	4-46
4.17.	Substitution of Ozone Depleting Substances (IPCC Source Category 2F)	4-49
4.18.	HCFC-22 Production (IPCC Source Category 2E1)	4-52
4.19.	Electrical Transmission and Distribution (IPCC Source Category 2F7)	4-54
4.20.	Semiconductor Manufacture (IPCC Source Category 2F6)	4-57
4.21.	Aluminum Production (IPCC Source Category 2C3)	4-61
4.22.	Magnesium Production and Processing (IPCC Source Category 2C4)	4-66
4.23.	Industrial Sources of Indirect Greenhouse Gases	4-70
<b>5.</b>	<b>SOLVENT AND OTHER PRODUCT USE</b>	<b>5-1</b>
5.1.	Nitrous Oxide Product Usage (IPCC Source Category 3D)	5-1
5.2.	Indirect Greenhouse Gas Emissions from Solvent Use	5-4
<b>6.</b>	<b>AGRICULTURE</b>	<b>6-1</b>
6.1.	Enteric Fermentation (IPCC Source Category 4A)	6-2
6.2.	Manure Management (IPCC Source Category 4B)	6-6

6.3.	Rice Cultivation (IPCC Source Category 4C)	6-13
6.4.	Agricultural Soil Management (IPCC Source Category 4D)	6-18
6.5.	Field Burning of Agricultural Residues (IPCC Source Category 4F)	6-27
<b>7.</b>	<b>LAND USE, LAND-USE CHANGE, AND FORESTRY</b>	<b>7-1</b>
7.1.	Forest Land Remaining Forest Land	7-3
7.2.	Land Converted to Forest Land (IPCC Source Category 5A2)	7-12
7.3.	Cropland Remaining Cropland (IPCC Source Category 5B1)	7-13
7.4.	Land Converted to Cropland (IPCC Source Category 5B2)	7-25
7.5.	Grassland Remaining Grassland (IPCC Source Category 5C1)	7-28
7.6.	Land Converted to Grassland (IPCC Source Category 5C2)	7-33
7.7.	Settlements Remaining Settlements	7-37
7.8.	Land Converted to Settlements (Source Category 5E2)	7-47
<b>8.</b>	<b>WASTE</b>	<b>8-1</b>
8.1.	Landfills (IPCC Source Category 6A1)	8-1
8.2.	Wastewater Treatment (IPCC Source Category 6B)	8-6
8.3.	Human Sewage (Domestic Wastewater) (IPCC Source Category 6B)	8-10
8.4.	Waste Sources of Indirect Greenhouse Gases	8-13
<b>9.</b>	<b>OTHER</b>	<b>9-1</b>
<b>10.</b>	<b>RECALCULATIONS AND IMPROVEMENTS</b>	<b>10-1</b>
<b>11.</b>	<b>REFERENCES</b>	<b>11-1</b>

# List of Tables, Figures, and Boxes

## Tables

Table ES-1: Global Warming Potentials (100-Year Time Horizon) Used in this Report	ES-3
Table ES-2: Recent Trends in U.S. Greenhouse Gas Emissions and Sinks (Tg CO <sub>2</sub> Eq.)	ES-4
Table ES-3: CO <sub>2</sub> Emissions from Fossil Fuel Combustion by End-Use Sector (Tg CO <sub>2</sub> Eq.)	ES-7
Table ES-4: Recent Trends in U.S. Greenhouse Gas Emissions and Sinks by Chapter/IPCC Sector (Tg CO <sub>2</sub> Eq.)	ES-10
Table ES-5: Net CO <sub>2</sub> Flux from Land Use, Land-Use Change, and Forestry (Tg CO <sub>2</sub> Eq.)	ES-12
Table ES-6: U.S. Greenhouse Gas Emissions Allocated to Economic Sectors (Tg CO <sub>2</sub> Eq.)	ES-13
Table ES-7: U.S. Greenhouse Gas Emissions by Economic Sector with Electricity-Related Emissions Distributed (Tg CO <sub>2</sub> Eq.)	ES-14
Table ES-8: Recent Trends in Various U.S. Data (Index 1990 = 100) and Global Atmospheric CO <sub>2</sub> Concentration	ES-15
Table ES-9: Emissions of NO <sub>x</sub> , CO, NMVOCs, and SO <sub>2</sub> (Gg)	ES-16
Table 1-1: Global Atmospheric Concentration (ppm unless otherwise specified), Rate of Concentration Change (ppb/year), and Atmospheric Lifetime (years) of Selected Greenhouse Gases	1-3
Table 1-2: Global Warming Potentials and Atmospheric Lifetimes (Years) Used in this Report	1-7
Table 1-3: Comparison of 100-Year GWPs	1-8
Table 1-4: Key Categories for the United States (1990-2004) Based on Tier 1 Approach	1-12
Table 1-5: Estimated Overall Inventory Quantitative Uncertainty (Tg CO <sub>2</sub> Eq. and Percent)	1-15
Table 1-6: IPCC Sector Descriptions	1-16
Table 1-7: List of Annexes	1-17
Table 2-1: Annual Change in CO <sub>2</sub> Emissions from Fossil Fuel Combustion for Selected Fuels and Sectors (Tg CO <sub>2</sub> Eq. and Percent)	2-2
Table 2-2: Recent Trends in Various U.S. Data (Index 1990 = 100) and Global Atmospheric CO <sub>2</sub> Concentration	2-4
Table 2-3: Recent Trends in U.S. Greenhouse Gas Emissions and Sinks (Tg CO <sub>2</sub> Eq.)	2-4
Table 2-4: Recent Trends in U.S. Greenhouse Gas Emissions and Sinks (Gg)	2-6
Table 2-5: Recent Trends in U.S. Greenhouse Gas Emissions and Sinks by Chapter/IPCC Sector (Tg CO <sub>2</sub> Eq.)	2-8
Table 2-6: Emissions from Energy (Tg CO <sub>2</sub> Eq.)	2-8
Table 2-7: CO <sub>2</sub> Emissions from Fossil Fuel Combustion by End-Use Sector (Tg CO <sub>2</sub> Eq.)	2-9
Table 2-8: Emissions from Industrial Processes (Tg CO <sub>2</sub> Eq.)	2-13
Table 2-9: N <sub>2</sub> O Emissions from Solvent and Other Product Use (Tg CO <sub>2</sub> Eq.)	2-17
Table 2-10: Emissions from Agriculture (Tg CO <sub>2</sub> Eq.)	2-18
Table 2-11: Net CO <sub>2</sub> Flux from Land Use, Land-Use Change, and Forestry (Tg CO <sub>2</sub> Eq.)	2-20
Table 2-12: N <sub>2</sub> O Emissions from Land Use, Land-Use Change, and Forestry (Tg CO <sub>2</sub> Eq.)	2-20
Table 2-13: Emissions from Waste (Tg CO <sub>2</sub> Eq.)	2-21

Table 2-14: U.S. Greenhouse Gas Emissions Allocated to Economic Sectors (Tg CO <sub>2</sub> Eq. and Percent of Total in 2004)	2-23
Table 2-15: Electricity Generation-Related Greenhouse Gas Emissions (Tg CO <sub>2</sub> Eq.)	2-25
Table 2-16: U.S Greenhouse Gas Emissions by “Economic Sector” and Gas with Electricity-Related Emissions Distributed (Tg CO <sub>2</sub> Eq.) and Percent of Total in 2004	2-26
Table 2-17: Transportation-Related Greenhouse Gas Emissions (Tg CO <sub>2</sub> Eq.)	2-27
Table 2-18: Emissions of NO <sub>x</sub> , CO, NMVOCs, and SO <sub>2</sub> (Gg)	2-29
Table 3-1: CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O Emissions from Energy (Tg CO <sub>2</sub> Eq.)	3-1
Table 3-2: CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O Emissions from Energy (Gg)	3-2
Table 3-3: CO <sub>2</sub> Emissions from Fossil Fuel Combustion by Fuel Type and Sector (Tg CO <sub>2</sub> Eq.)	3-3
Table 3-4: Annual Change in CO <sub>2</sub> Emissions from Fossil Fuel Combustion for Selected Fuels and Sectors (Tg CO <sub>2</sub> Eq. and Percent)	3-4
Table 3-5: CO <sub>2</sub> Emissions from International Bunker Fuels (Tg CO <sub>2</sub> Eq.)	3-6
Table 3-6: CO <sub>2</sub> Emissions from Fossil Fuel Combustion by End-Use Sector (Tg CO <sub>2</sub> Eq.)	3-6
Table 3-7: CO <sub>2</sub> Emissions from Fossil Fuel Combustion in Transportation End-Use Sector (Tg CO <sub>2</sub> Eq.)	3-8
Table 3-8: Carbon Intensity from Direct Fossil Fuel Combustion by Sector (Tg CO <sub>2</sub> Eq./QBtu)	3-12
Table 3-9: Carbon Intensity from all Energy Consumption by Sector (Tg CO <sub>2</sub> Eq./QBtu)	3-12
Table 3-10: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Energy-related Fossil Fuel Combustion by Fuel Type and Sector (Tg CO <sub>2</sub> Eq. and Percent)	3-17
Table 3-11: CO <sub>2</sub> Emissions from Non-Energy Use Fossil Fuel Consumption (Tg CO <sub>2</sub> Eq.)	3-19
Table 3-12: Adjusted Consumption of Fossil Fuels for Non-Energy Uses (TBtu)	3-20
Table 3-13: 2004 Adjusted Non-Energy Use Fossil Fuel Consumption, Storage, and Emissions	3-21
Table 3-14: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Non-Energy Uses of Fossil Fuels (Tg CO <sub>2</sub> Eq. and Percent)	3-22
Table 3-15: Tier 2 Quantitative Uncertainty Estimates for Storage Factors of Non-Energy Uses of Fossil Fuels (Percent)	3-23
Table 3-16: CH <sub>4</sub> Emissions from Stationary Combustion (Tg CO <sub>2</sub> Eq.)	3-25
Table 3-17: N <sub>2</sub> O Emissions from Stationary Combustion (Tg CO <sub>2</sub> Eq.)	3-26
Table 3-18: CH <sub>4</sub> Emissions from Stationary Combustion (Gg)	3-26
Table 3-19: N <sub>2</sub> O Emissions from Stationary Combustion (Gg)	3-27
Table 3-20: NO <sub>x</sub> , CO, and NMVOC Emissions from Stationary Combustion in 2004 (Gg)	3-28
Table 3-21: Tier 2 Quantitative Uncertainty Estimates for CH <sub>4</sub> and N <sub>2</sub> O Emissions from Energy-Related Stationary Combustion, Including Biomass (Tg CO <sub>2</sub> Eq. and Percent)	3-30
Table 3-22: CH <sub>4</sub> Emissions from Mobile Combustion (Tg CO <sub>2</sub> Eq.)	3-31
Table 3-23: N <sub>2</sub> O Emissions from Mobile Combustion (Tg CO <sub>2</sub> Eq.)	3-32
Table 3-24: CH <sub>4</sub> Emissions from Mobile Combustion (Gg)	3-32
Table 3-25: N <sub>2</sub> O Emissions from Mobile Combustion (Gg)	3-33
Table 3-26: NO <sub>x</sub> , CO, and NMVOC Emissions from Mobile Combustion in 2004 (Gg)	3-33
Table 3-27: Tier 2 Quantitative Uncertainty Estimates for CH <sub>4</sub> and N <sub>2</sub> O Emissions from Mobile Sources (Tg CO <sub>2</sub>	

Eq. and Percent)	3-38
Table 3-28: CH <sub>4</sub> Emissions from Coal Mining (Tg CO <sub>2</sub> Eq.)	3-40
Table 3-29: CH <sub>4</sub> Emissions from Coal Mining (Gg)	3-40
Table 3-30: Coal Production (Thousand Metric Tons)	3-41
Table 3-31: Tier 2 Quantitative Uncertainty Estimates for CH <sub>4</sub> Emissions from Coal Mining (Tg CO <sub>2</sub> Eq. and Percent)	3-42
Table 3-32: CH <sub>4</sub> Emissions from Abandoned Coal Mines (Tg CO <sub>2</sub> Eq.)	3-43
Table 3-33: CH <sub>4</sub> Emissions from Abandoned Coal Mines (Gg)	3-43
Table 3-34: Tier 2 Quantitative Uncertainty Estimates for CH <sub>4</sub> Emissions from Abandoned Underground Coal Mines (Tg CO <sub>2</sub> Eq. and Percent)	3-46
Table 3-35: CH <sub>4</sub> Emissions from Petroleum Systems (Tg CO <sub>2</sub> Eq.)	3-47
Table 3-36: CH <sub>4</sub> Emissions from Petroleum Systems (Gg)	3-47
Table 3-37: Tier 2 Quantitative Uncertainty Estimates for CH <sub>4</sub> Emissions from Petroleum Systems (Tg CO <sub>2</sub> Eq. and Percent)	3-49
Table 3-38: CH <sub>4</sub> Emissions from Natural Gas Systems (Tg CO <sub>2</sub> Eq.)	3-50
Table 3-39: CH <sub>4</sub> Emissions from Natural Gas Systems (Gg)	3-51
Table 3-40: Tier 2 Quantitative Uncertainty Estimates for CH <sub>4</sub> Emissions from Natural Gas Systems (Tg CO <sub>2</sub> Eq. and Percent)	3-52
Table 3-41: CO <sub>2</sub> and N <sub>2</sub> O Emissions from Municipal Solid Waste Combustion (Tg CO <sub>2</sub> Eq.)	3-53
Table 3-42: CO <sub>2</sub> and N <sub>2</sub> O Emissions from Municipal Solid Waste Combustion (Gg)	3-54
Table 3-43: NO <sub>x</sub> , CO, and NMVOC Emissions from Municipal Solid Waste Combustion (Gg)	3-54
Table 3-44: Municipal Solid Waste Generation (Metric Tons) and Percent Combusted	3-55
Table 3-45: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> and N <sub>2</sub> O from Municipal Solid Waste Combustion (Tg CO <sub>2</sub> Eq. and Percent)	3-56
Table 3-46: U.S. Municipal Solid Waste Combusted, as Reported by EPA and BioCycle (Metric Tons)	3-57
Table 3-47: CO <sub>2</sub> Emissions from On-Shore and Off-Shore Natural Gas Flaring (Tg CO <sub>2</sub> Eq.)	3-58
Table 3-48: CO <sub>2</sub> Emissions from On-Shore and Off-Shore Natural Gas Flaring (Gg)	3-58
Table 3-49: NO <sub>x</sub> , NMVOCs, and CO Emissions from Oil and Gas Activities (Gg)	3-58
Table 3-50: Total Natural Gas Reported Vented and Flared (Million Ft <sup>3</sup> ) and Thermal Conversion Factor (Btu/Ft <sup>3</sup> )	3-59
Table 3-51: Volume Flared Offshore (MMcf) and Fraction Vented and Flared (Percent)	3-59
Table 3-52: CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O Emissions from International Bunker Fuels (Tg CO <sub>2</sub> Eq.)	3-61
Table 3-53: CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, and Indirect Greenhouse Gas Emissions from International Bunker Fuels (Gg)	3-62
Table 3-54: Aviation Jet Fuel Consumption for International Transport (Million Gallons)	3-63
Table 3-55: Marine Fuel Consumption for International Transport (Million Gallons)	3-63
Table 3-56: CO <sub>2</sub> Emissions from Wood Consumption by End-Use Sector (Tg CO <sub>2</sub> Eq.)	3-65
Table 3-57: CO <sub>2</sub> Emissions from Wood Consumption by End-Use Sector (Gg)	3-65
Table 3-58: CO <sub>2</sub> Emissions from Ethanol Consumption (Tg CO <sub>2</sub> Eq. and Gg)	3-66

Table 3-59: Woody Biomass Consumption by Sector (Trillion Btu)	3-66
Table 3-60: Ethanol Consumption (Trillion Btu)	3-66
Table 3-61: CH <sub>4</sub> Emissions from Non-Combustion Fossil Sources (Gg)	3-68
Table 3-62: Formation of CO <sub>2</sub> through Atmospheric CH <sub>4</sub> Oxidation (Tg CO <sub>2</sub> Eq.)	3-68
Table 4-1: Emissions from Industrial Processes (Tg CO <sub>2</sub> Eq.)	4-1
Table 4-2: Emissions from Industrial Processes (Gg)	4-2
Table 4-3: CO <sub>2</sub> and CH <sub>4</sub> Emissions from Iron and Steel Production (Tg CO <sub>2</sub> Eq.)	4-4
Table 4-4: CO <sub>2</sub> and CH <sub>4</sub> Emissions from Iron and Steel Production (Gg)	4-4
Table 4-5: CH <sub>4</sub> Emission Factors for Coal Coke, Sinter, and Pig Iron Production (g/kg)	4-5
Table 4-6: Production and Consumption Data for the Calculation of CO <sub>2</sub> and CH <sub>4</sub> Emissions from Iron and Steel Production (Thousand Metric Tons)	4-6
Table 4-7: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> and CH <sub>4</sub> Emissions from Iron and Steel Production (Tg CO <sub>2</sub> Eq. and Percent)	4-7
Table 4-8: CO <sub>2</sub> Emissions from Cement Production (Tg CO <sub>2</sub> Eq. and Gg)	4-8
Table 4-9: Cement Production (Gg)	4-9
Table 4-10: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Cement Manufacture (Tg CO <sub>2</sub> Eq. and Percent)	4-10
Table 4-11: CO <sub>2</sub> Emissions from Ammonia Manufacture and Urea Application (Tg CO <sub>2</sub> Eq.)	4-11
Table 4-12: CO <sub>2</sub> Emissions from Ammonia Manufacture and Urea Application (Gg)	4-11
Table 4-13: Ammonia Production, Urea Production, and Urea Net Imports (Gg)	4-12
Table 4-14: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Ammonia Manufacture and Urea Application (Tg CO <sub>2</sub> Eq. and Percent)	4-14
Table 4-15: Net CO <sub>2</sub> Emissions from Lime Manufacture (Tg CO <sub>2</sub> Eq.)	4-15
Table 4-16: CO <sub>2</sub> Emissions from Lime Manufacture (Gg)	4-15
Table 4-17: Lime Production and Lime Use for Sugar Refining and PCC (Gg)	4-16
Table 4-18: Hydrated Lime Production (Gg)	4-16
Table 4-19: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Lime Manufacture (Tg CO <sub>2</sub> Eq. and Percent)	4-18
Table 4-20: CO <sub>2</sub> Emissions from Limestone & Dolomite Use (Tg CO <sub>2</sub> Eq.)	4-18
Table 4-21: CO <sub>2</sub> Emissions from Limestone & Dolomite Use (Gg)	4-19
Table 4-22: Limestone and Dolomite Consumption (Thousand Metric Tons)	4-20
Table 4-23: Dolomitic Magnesium Metal Production Capacity (Metric Tons)	4-20
Table 4-24: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Limestone and Dolomite Use (Tg CO <sub>2</sub> Eq. and Percent)	4-21
Table 4-25: CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption (Tg CO <sub>2</sub> Eq.)	4-22
Table 4-26: CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption (Gg)	4-22
Table 4-27: Soda Ash Manufacture and Consumption (Gg)	4-23
Table 4-28: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption (Tg CO <sub>2</sub> Eq. and Percent)	4-23

Table 4-29: CO <sub>2</sub> Emissions from Titanium Dioxide (Tg CO <sub>2</sub> Eq. and Gg)	4-24
Table 4-30: Titanium Dioxide Production (Gg)	4-25
Table 4-31: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Titanium Dioxide Production (Tg CO <sub>2</sub> Eq. and Percent)	4-25
Table 4-32: CO <sub>2</sub> Emissions from Phosphoric Acid Production (Tg CO <sub>2</sub> Eq. and Gg)	4-26
Table 4-33: Phosphate Rock Domestic Production, Exports, and Imports (Gg)	4-27
Table 4-34: Chemical Composition of Phosphate Rock (percent by weight)	4-27
Table 4-35: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Phosphoric Acid Production (Tg CO <sub>2</sub> Eq. and Percent)	4-29
Table 4-36: CO <sub>2</sub> Emissions from Ferroalloy Production (Tg CO <sub>2</sub> Eq. and Gg)	4-29
Table 4-37: Production of Ferroalloys (Metric Tons)	4-30
Table 4-38: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Ferroalloy Production (Tg CO <sub>2</sub> Eq. and Percent)	4-31
Table 4-39: CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption (Tg CO <sub>2</sub> Eq. and Gg)	4-32
Table 4-40: CO <sub>2</sub> Consumption (Metric Tons)	4-33
Table 4-41: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption (Tg CO <sub>2</sub> Eq. and Percent)	4-34
Table 4-42: CO <sub>2</sub> Emissions from Zinc Production (Tg CO <sub>2</sub> Eq. and Gg)	4-35
Table 4-43: Zinc Production (Metric Tons)	4-36
Table 4-44: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Zinc Production (Tg CO <sub>2</sub> Eq. and Percent)	4-37
Table 4-45: CO <sub>2</sub> Emissions from Lead Production (Tg CO <sub>2</sub> Eq. and Gg)	4-38
Table 4-46: Lead Production (Metric Tons)	4-39
Table 4-47: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Zinc Production (Tg CO <sub>2</sub> Eq. and Percent)	4-39
Table 4-48: CO <sub>2</sub> and CH <sub>4</sub> Emissions from Petrochemical Production (Tg CO <sub>2</sub> Eq.)	4-40
Table 4-49: CO <sub>2</sub> and CH <sub>4</sub> Emissions from Petrochemical Production (Gg)	4-40
Table 4-50: Production of Selected Petrochemicals (Thousand Metric Tons)	4-40
Table 4-51: Carbon Black Feedstock (Primary Feedstock) and Natural Gas Feedstock (Secondary Feedstock) Consumption (Thousand Metric Tons)	4-41
Table 4-52: Tier 2 Quantitative Uncertainty Estimates for CH <sub>4</sub> Emissions from Petrochemical Production and CO <sub>2</sub> Emissions from Carbon Black Production (Tg CO <sub>2</sub> Eq. and Percent)	4-42
Table 4-53: CO <sub>2</sub> and CH <sub>4</sub> Emissions from Silicon Carbide Production and Consumption (Tg CO <sub>2</sub> Eq.)	4-42
Table 4-54: CO <sub>2</sub> and CH <sub>4</sub> Emissions from Silicon Carbide Production and Consumption (Gg)	4-43
Table 4-55: Production and Consumption of Silicon Carbide (Metric Tons)	4-43
Table 4-56: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Silicon Carbide Production (Tg CO <sub>2</sub> Eq. and Percent)	4-44
Table 4-57: N <sub>2</sub> O Emissions from Nitric Acid Production (Tg CO <sub>2</sub> Eq. and Gg)	4-44
Table 4-58: Nitric Acid Production (Gg)	4-45
Table 4-59: Sources of Uncertainty in N <sub>2</sub> O Emissions from Nitric Acid	4-45



Table 4-60: Tier 2 Quantitative Uncertainty Estimates for N <sub>2</sub> O Emissions From Nitric Acid Production (Tg CO <sub>2</sub> Eq. and Percent)	4-46
Table 4-61: N <sub>2</sub> O Emissions from Adipic Acid Production (Tg CO <sub>2</sub> Eq. and Gg)	4-47
Table 4-62: Adipic Acid Production (Gg)	4-48
Table 4-63: Sources of Uncertainty in N <sub>2</sub> O Emissions from Adipic Acid Production	4-48
Table 4-64: Tier 2 Quantitative Uncertainty Estimates for N <sub>2</sub> O Emissions from Adipic Acid Production (Tg CO <sub>2</sub> Eq. and Percent)	4-49
Table 4-65: Emissions of HFCs and PFCs from ODS Substitutes (Tg CO <sub>2</sub> Eq.)	4-50
Table 4-66: Emissions of HFCs and PFCs from ODS Substitution (Mg)	4-50
Table 4-67: Tier 2 Quantitative Uncertainty Estimates for HFC and PFC Emissions from ODS Substitutes (Tg CO <sub>2</sub> Eq. and Percent)	4-52
Table 4-68: HFC-23 Emissions from HCFC-22 Production (Tg CO <sub>2</sub> Eq. and Gg)	4-53
Table 4-69: HCFC-22 Production (Gg)	4-53
Table 4-70: Tier 1 Quantitative Uncertainty Estimates for HFC-23 Emissions from HCFC-22 Production (Tg CO <sub>2</sub> Eq. and Percent)	4-53
Table 4-71: SF <sub>6</sub> Emissions from Electric Power Systems and Original Equipment Manufactures (Tg CO <sub>2</sub> Eq.)	4-54
Table 4-72: SF <sub>6</sub> Emissions from Electric Power Systems and Original Equipment Manufactures (Gg)	4-54
Table 4-73: Tier 2 Quantitative Uncertainty Estimates for SF <sub>6</sub> Emissions from Electrical Transmission and Distribution (Tg CO <sub>2</sub> Eq. and Percent)	4-57
Table 4-74: PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture (Tg CO <sub>2</sub> Eq.)	4-58
Table 4-75: PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture (Mg)	4-58
Table 4-76: Tier 2 Quantitative Uncertainty Estimates for HFC, PFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture (Tg CO <sub>2</sub> Eq. and Percent)	4-61
Table 4-77: CO <sub>2</sub> Emissions from Aluminum Production (Tg CO <sub>2</sub> Eq. and Gg)	4-61
Table 4-78: PFC Emissions from Aluminum Production (Tg CO <sub>2</sub> Eq.)	4-62
Table 4-79: PFC Emissions from Aluminum Production (Gg)	4-62
Table 4-80: Production of Primary Aluminum (Gg)	4-64
Table 4-81: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> and PFC Emissions from Aluminum Production (Tg CO <sub>2</sub> Eq. and Percent)	4-65
Table 4-82: SF <sub>6</sub> Emissions from Magnesium Production and Processing (Tg CO <sub>2</sub> Eq. and Gg)	4-66
Table 4-83: SF <sub>6</sub> Emission Factors (kg SF <sub>6</sub> per metric ton of magnesium)	4-67
Table 4-84: Tier 2 Quantitative Uncertainty Estimates for SF <sub>6</sub> Emissions from Magnesium Production and Processing (Tg CO <sub>2</sub> Eq. and Percent)	4-68
Table 4-85: 2004 Potential and Actual Emissions of HFCs, PFCs, and SF <sub>6</sub> from Selected Sources (Tg CO <sub>2</sub> Eq.)	4-69
Table 4-86: NO <sub>x</sub> , CO, and NMVOC Emissions from Industrial Processes (Gg)	4-70
Table 5-1: N <sub>2</sub> O Emissions from Solvent and Other Product Use (Tg CO <sub>2</sub> Eq. and Gg)	5-1
Table 5-2: Indirect Greenhouse Gas Emissions from Solvent and Other Product Use (Gg)	5-1
Table 5-3: N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage (Tg CO <sub>2</sub> Eq. and Gg)	5-1
Table 5-4: N <sub>2</sub> O Production (Gg)	5-3

Table 5-5: Sources of Uncertainty in N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	5-3
Table 5-6: Tier 2 Quantitative Uncertainty Estimates for N <sub>2</sub> O Emissions From N <sub>2</sub> O Product Usage (Tg CO <sub>2</sub> Eq. and Percent)	5-3
Table 5-7: Emissions of NO <sub>x</sub> , CO, and NMVOC from Solvent Use (Gg)	5-4
Table 6-1: Emissions from Agriculture (Tg CO <sub>2</sub> Eq.)	6-1
Table 6-2: Emissions from Agriculture (Gg)	6-1
Table 6-3: CH <sub>4</sub> Emissions from Enteric Fermentation (Tg CO <sub>2</sub> Eq.)	6-2
Table 6-4: CH <sub>4</sub> Emissions from Enteric Fermentation (Gg)	6-3
Table 6-5: Quantitative Uncertainty Estimates for CH <sub>4</sub> Emissions from Enteric Fermentation (Tg CO <sub>2</sub> Eq. and Percent)	6-5
Table 6-6: CH <sub>4</sub> and N <sub>2</sub> O Emissions from Manure Management (Tg CO <sub>2</sub> Eq.)	6-7
Table 6-7: CH <sub>4</sub> and N <sub>2</sub> O Emissions from Manure Management (Gg)	6-8
Table 6-8: Tier 2 Quantitative Uncertainty Estimates for CH <sub>4</sub> and N <sub>2</sub> O Emissions from Manure Management (Tg CO <sub>2</sub> Eq. and Percent)	6-10
Table 6-9: CH <sub>4</sub> Emissions from Rice Cultivation (Tg CO <sub>2</sub> Eq.)	6-14
Table 6-10: CH <sub>4</sub> Emissions from Rice Cultivation (Gg)	6-15
Table 6-11: Rice Areas Harvested (Hectares)	6-16
Table 6-12: Tier 2 Quantitative Uncertainty Estimates for CH <sub>4</sub> Emissions from Rice Cultivation (Tg CO <sub>2</sub> Eq. and Percent)	6-17
Table 6-13: N <sub>2</sub> O Emissions from Agricultural Soils (Tg CO <sub>2</sub> Eq.)	6-19
Table 6-14: N <sub>2</sub> O Emissions from Agricultural Soils (Gg)	6-19
Table 6-15: Direct N <sub>2</sub> O Emissions from Agricultural Soils (Tg CO <sub>2</sub> Eq.)	6-19
Table 6-16: Indirect N <sub>2</sub> O Emissions from all Land Use Types* (Tg CO <sub>2</sub> Eq.)	6-19
Table 6-17: Tier 1 Quantitative Uncertainty Estimates of N <sub>2</sub> O Emissions from Agricultural Soil Management in 2004 (Tg CO <sub>2</sub> Eq. and Percent)	6-24
Table 6-18: Changes and Percent Difference in N <sub>2</sub> O Emission Estimates for Agricultural Soil Management (Tg CO <sub>2</sub> Eq. and Percent)	6-25
Table 6-19: CH <sub>4</sub> and N <sub>2</sub> O Emissions from Field Burning of Agricultural Residues (Tg CO <sub>2</sub> Eq.)	6-28
Table 6-20: CH <sub>4</sub> , N <sub>2</sub> O, CO, and NO <sub>x</sub> Emissions from Field Burning of Agricultural Residues (Gg)	6-28
Table 6-21: Agricultural Crop Production (Gg of Product)	6-30
Table 6-22: Percentage of Rice Area Burned by State	6-30
Table 6-23: Percentage of Rice Area Burned in California, 1990-1998	6-30
Table 6-24: Key Assumptions for Estimating Emissions from Field Burning of Agricultural Residues	6-31
Table 6-25: Greenhouse Gas Emission Ratios	6-31
Table 6-26: Tier 2 Monte Carlo Uncertainty Estimates for CH <sub>4</sub> and N <sub>2</sub> O Emissions from Field Burning of Agricultural Residues (Tg CO <sub>2</sub> Eq. and Percent)	6-32
Table 6-27: Changes and Percent Difference in CH <sub>4</sub> and N <sub>2</sub> O Emission Estimates for Field Burning of Agricultural Residues (Tg CO <sub>2</sub> Eq. and Percent)	6-32
Table 7-1: Net CO <sub>2</sub> Flux from Land Use, Land-Use Change, and Forestry (Tg CO <sub>2</sub> Eq.)	7-1

Table 7-2: Net CO <sub>2</sub> Flux from Land Use, Land-Use Change, and Forestry (Tg C)	7-2
Table 7-3: N <sub>2</sub> O Emissions from Land Use, Land-Use Change, and Forestry (Tg CO <sub>2</sub> Eq.)	7-3
Table 7-4: N <sub>2</sub> O Emissions from Land Use, Land-Use Change, and Forestry (Gg)	7-3
Table 7-5. Net Annual Changes in Carbon Stocks (Tg CO <sub>2</sub> /yr) in Forest and Harvested Wood Pools	7-5
Table 7-6. Net Annual Changes in Carbon Stocks (Tg C/yr) in Forest and Harvested Wood Pools	7-6
Table 7-7. Carbon Stocks (Tg C) in Forest and Harvested Wood Pools	7-6
Table 7-8: Tier 2 Quantitative Uncertainty Estimates for Net CO <sub>2</sub> Flux from Forest Land Remaining Forest Land: Changes in Forest Carbon Stocks (Tg CO <sub>2</sub> Eq. and Percent)	7-9
Table 7-9. N <sub>2</sub> O Fluxes from Soils in Forest Land Remaining Forest Land (Tg CO <sub>2</sub> Eq. and Gg)	7-11
Table 7-10: Tier 1 Quantitative Uncertainty Estimates of N <sub>2</sub> O Fluxes from Soils in Forest Land Remaining Forest Land (Tg CO <sub>2</sub> Eq. and Percent)	7-12
Table 7-11: Net Soil C Stock Changes and Liming Emissions in Cropland Remaining Cropland (Tg CO <sub>2</sub> Eq.)	7-14
Table 7-12: Net Soil C Stock Changes and Liming Emissions in Cropland Remaining Cropland (Tg C)	7-14
Table 7-13: Applied Minerals (Million Metric Tons)	7-19
Table 7-14: Quantitative Uncertainty Estimates for C Stock Changes in Mineral Soils occurring within Cropland Remaining Cropland that were Estimated Using the Tier 3 Method (Tg CO <sub>2</sub> Eq. and Percent)	7-20
Table 7-15: Quantitative Uncertainty Estimates for C Stock Changes in Mineral Soils Occurring within Cropland Remaining Cropland that were Estimated Using the Tier 2 Inventory Method (Tg CO <sub>2</sub> Eq. and Percent)	7-21
Table 7-16: Uncertainty Estimates for C Stock Changes in Mineral Soils Occurring within Cropland Remaining Cropland that were Estimated Using the Tier 1 Inventory Method (Tg CO <sub>2</sub> Eq. and Percent)	7-21
Table 7-17: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Organic Soils Occurring Within Cropland Remaining Cropland (Tg CO <sub>2</sub> Eq. and Percent)	7-21
Table 7-18: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Liming of Agricultural Soils (Tg CO <sub>2</sub> Eq. and Percent)	7-23
Table 7-19: Net Soil C Stock Changes in Land Converted to Cropland (Tg CO <sub>2</sub> Eq.)	7-25
Table 7-20: Net Soil C Stock Changes in Land Converted to Cropland (Tg C)	7-25
Table 7-21: Quantitative Uncertainty Estimates for C stock changes in mineral soils occurring within Land Converted to Cropland, which were estimated using the Tier 3 method (Tg CO <sub>2</sub> Eq. and Percent)	7-28
Table 7-22: Net Soil C Stock Changes in Grassland Remaining Grassland (Tg CO <sub>2</sub> Eq.)	7-29
Table 7-23: Net Soil C Stock Changes in Grassland Remaining Grassland (Tg C)	7-29
Table 7-24: Quantitative Uncertainty Estimates for C Stock Changes in Mineral Soils Occurring within Grassland Remaining Grassland, which were Estimated Using the Tier 3 Method (Tg CO <sub>2</sub> Eq. and Percent)	7-32
Table 7-25: Uncertainty Estimates for C Stock Changes in Mineral Soils Occurring within Grassland Remaining Grassland, which were Estimated Using the Tier 2 Inventory Method (Tg CO <sub>2</sub> Eq. and Percent).	7-32
Table 7-26: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Emissions from Organic Soils Occurring within Grassland Remaining Grassland (Tg CO <sub>2</sub> Eq. and Percent)	7-32
Table 7-27: Net Soil C Stock Changes for Land Converted to Grassland (Tg CO <sub>2</sub> Eq.)	7-33
Table 7-28: Net Soil C Stock Changes for Land Converted to Grassland (Tg C)	7-34
Table 7-29: Quantitative Uncertainty Estimates for C Stock Changes in Mineral Soils Occurring within Land Converted to Grassland, which were Estimated Using the Tier 3 Method (Tg CO <sub>2</sub> Eq. and Percent)	7-36
Table 7-30: Quantitative Uncertainty Estimates for C Stock Changes in Mineral Soils Occurring within Land	

Converted to Grassland that were Estimated Using the Tier 2 Inventory Method (Tg CO <sub>2</sub> Eq. and Percent)	7-36
Table 7-31: Net Changes in Yard Trimming and Food Scrap Stocks in Landfills (Tg CO <sub>2</sub> Eq.)	7-37
Table 7-32: Net Changes in Yard Trimming and Food Scrap Stocks in Landfills (Tg C)	7-38
Table 7-33: Moisture Content (%), Carbon Storage Factor, Initial Carbon Content (%), Proportion of Initial Carbon Sequestered (%), and Half-Life (years) for Landfilled Yard Trimmings and Food Scraps in Landfills	7-40
Table 7-34: Carbon Stocks in Yard Trimmings and Food Scraps in Landfills (Tg C)	7-40
Table 7-35: Tier 2 Quantitative Uncertainty Estimates for CO <sub>2</sub> Flux from Yard Trimmings and Food Scraps in Landfills (Tg CO <sub>2</sub> Eq. and Percent)	7-41
Table 7-36: Net C Flux from Urban Trees (Tg CO <sub>2</sub> Eq. and Tg C)	7-43
Table 7-37: Carbon Stocks (Metric Tons C), Annual Carbon Sequestration (Metric Tons C/yr), Tree Cover (Percent), and Annual Carbon Sequestration per Area of Tree Cover (kg C/m <sup>2</sup> cover-yr) for Ten U.S. Cities	7-44
Table 7-38: Tier 1 Quantitative Uncertainty Estimates for Net C Flux from Changes in Carbon Stocks in Urban Trees (Tg CO <sub>2</sub> Eq. and Percent)	7-45
Table 7-39: N <sub>2</sub> O Fluxes from Soils in Settlements Remaining Settlements (Tg CO <sub>2</sub> Eq. and Gg)	7-46
Table 7-40: Tier 1 Quantitative Uncertainty Estimates of N <sub>2</sub> O Emissions from Soils in Settlements Remaining Settlements (Tg CO <sub>2</sub> Eq. and Percent)	7-47
Table 8-1: Emissions from Waste (Tg CO <sub>2</sub> Eq.)	8-1
Table 8-2: Emissions from Waste (Gg)	8-1
Table 8-3: CH <sub>4</sub> Emissions from Landfills (Tg CO <sub>2</sub> Eq.)	8-2
Table 8-4: CH <sub>4</sub> Emissions from Landfills (Gg)	8-3
Table 8-5: Tier 2 Quantitative Uncertainty Estimates for CH <sub>4</sub> Emissions from Landfills (Tg CO <sub>2</sub> Eq. and Percent)	8-4
Table 8-6: CH <sub>4</sub> Emissions from Domestic and Industrial Wastewater Treatment (Tg CO <sub>2</sub> Eq.)	8-6
Table 8-7: CH <sub>4</sub> Emissions from Domestic and Industrial Wastewater Treatment (Gg)	8-7
Table 8-8: U.S. Population (Millions) and Domestic Wastewater BOD <sub>5</sub> Produced (Gg)	8-7
Table 8-9: U.S. Pulp and Paper, Meat and Poultry, and Vegetables, Fruits and Juices Production (Tg)	8-9
Table 8-10: Tier 2 Quantitative Uncertainty Estimates for CH <sub>4</sub> Emissions from Wastewater Treatment (Tg CO <sub>2</sub> Eq. and Percent)	8-9
Table 8-11: N <sub>2</sub> O Emissions from Human Sewage (Tg CO <sub>2</sub> Eq. and Gg)	8-10
Table 8-12: U.S. Population (Millions) and Average Protein Intake [kg/(person-year)]	8-12
Table 8-13: Sources of Uncertainty in N <sub>2</sub> O Emissions from Human Sewage	8-12
Table 8-14: Tier 2 Quantitative Uncertainty Estimates for N <sub>2</sub> O Emissions from Human Sewage (Tg CO <sub>2</sub> Eq. and Percent)	8-13
Table 8-15: Emissions of NO <sub>x</sub> , CO, and NMVOC from Waste (Gg)	8-13
Table 10-1: Revisions to U.S. Greenhouse Gas Emissions (Tg CO <sub>2</sub> Eq.)	10-2
Table 10-2: Revisions to Net Flux of CO <sub>2</sub> to the Atmosphere from Land Use, Land-Use Change, and Forestry (Tg CO <sub>2</sub> Eq.)	10-3

## Figures

Figure ES-1: U.S. Greenhouse Gas Emissions by Gas	ES-4
Figure ES-2: Annual Percent Change in U.S. Greenhouse Gas Emissions	ES-4
Figure ES-3: Cumulative Change in U.S. Greenhouse Gas Emissions Relative to 1990	ES-4
Figure ES-4: 2004 Greenhouse Gas Emissions by Gas	ES-6
Figure ES-5: 2004 Sources of CO <sub>2</sub>	ES-6
Figure ES-6: 2004 CO <sub>2</sub> Emissions from Fossil Fuel Combustion by Sector and Fuel Type	ES-7
Figure ES-7: 2004 End-Use Sector Emissions of CO <sub>2</sub> from Fossil Fuel Combustion	ES-7
Figure ES-8: 2004 U.S. Sources of CH <sub>4</sub>	ES-9
Figure ES-9: 2004 U.S. Sources of N <sub>2</sub> O	ES-9
Figure ES-10: 2004 U.S. Sources of HFCs, PFCs, and SF <sub>6</sub>	ES-10
Figure ES-11: U.S. Greenhouse Gas Emissions by Chapter/IPCC Sector	ES-10
Figure ES-12: 2004 U.S. Energy Consumption by Energy Source	ES-11
Figure ES-13: Emissions Allocated to Economic Sectors	ES-13
Figure ES-14: Emissions with Electricity Distributed to Economic Sectors	ES-15
Figure ES-15: U.S. Greenhouse Gas Emissions Per Capita and Per Dollar of Gross Domestic Product	ES-15
Figure ES-16: 2004 Key Categories—Tier 1 Level Assessment	ES-17
Figure 2-1: U.S. Greenhouse Gas Emissions by Gas	2-1
Figure 2-2: Annual Percent Change in U.S. Greenhouse Gas Emissions	2-1
Figure 2-3: Cumulative Change in U.S. Greenhouse Gas Emissions Relative to 1990	2-1
Figure 2-4: U.S. Greenhouse Gas Emissions Per Capita and Per Dollar of Gross Domestic Product	2-4
Figure 2-5: U.S. Greenhouse Gas Emissions by Chapter/IPCC Sector	2-8
Figure 2-6: 2004 Energy Sector Greenhouse Gas Sources	2-8
Figure 2-7: 2004 U.S. Fossil Carbon Flows (Tg CO <sub>2</sub> Eq.)	2-8
Figure 2-8: 2004 CO <sub>2</sub> Emissions from Fossil Fuel Combustion by Sector and Fuel Type	2-10
Figure 2-9: 2004 End-Use Sector Emissions of CO <sub>2</sub> from Fossil Fuel Combustion	2-10
Figure 2-10: 2004 Industrial Processes Chapter Greenhouse Gas Sources	2-13
Figure 2-11: 2004 Agriculture Chapter Greenhouse Gas Sources	2-18
Figure 2-12: 2004 Waste Sector Greenhouse Gas Sources	2-21
Figure 2-13: Emissions Allocated to Economic Sectors	2-22
Figure 2-14: Emissions with Electricity Distributed to Economic Sectors	2-25
Figure 3-1: 2004 Energy Sector Greenhouse Gas Sources	3-1
Figure 3-2: 2004 U.S. Fossil Carbon Flows (Tg CO <sub>2</sub> Eq.)	3-1
Figure 3-3: 2004 U.S. Energy Consumption by Energy Source	3-4
Figure 3-4: U.S. Energy Consumption (Quadrillion Btu)	3-4
Figure 3-5: 2004 CO <sub>2</sub> Emissions from Fossil Fuel Combustion by Sector and Fuel Type	3-4

Figure 3-6: Annual Deviations from Normal Heating Degree Days for the United States (1949-2004)	3-5
Figure 3-7: Annual Deviations from Normal Cooling Degree Days for the United States (1949-2004)	3-5
Figure 3-8: Aggregate Nuclear and Hydroelectric Power Plant Capacity Factors in the United States (1973-2004)	3-5
Figure 3-9: 2004 End-Use Sector Emissions of CO <sub>2</sub> from Fossil Fuel Combustion	3-6
Figure 3-10: Motor Gasoline Retail Prices (Real)	3-7
Figure 3-11: Personal Vehicle Fuel Economy	3-7
Figure 3-12: Industrial Production Indexes (Index 1997=100)	3-9
Figure 3-13: Heating Degree Days	3-10
Figure 3-14: Cooling Degree Days	3-10
Figure 3-15: Electricity Generation Retail Sales by End-Use Sector	3-10
Figure 3-16: U.S. Energy Consumption and Energy-Related CO <sub>2</sub> Emissions Per Capita and Per Dollar GDP	3-13
Figure 3-17: Mobile Source CH <sub>4</sub> and N <sub>2</sub> O Emissions	3-31
Figure 4-1: 2004 Industrial Processes Chapter Greenhouse Gas Sources	4-1
Figure 6-1: 2004 Agriculture Chapter Greenhouse Gas Emission Sources	6-1
Figure 6-2: Direct and Indirect N <sub>2</sub> O Emissions from Agricultural Soils	6-18
Figure 7-1: Forest Sector Carbon Pools and Flows	7-4
Figure 7-2: Estimates of Net Annual Changes in Carbon Stocks for Major Carbon Pools	7-6
Figure 7-3: Average Carbon Density in the Forest Tree Pool in the Conterminous United States During 2005	7-7
Figure 7-4: Net C Stock Change for Mineral Soils in Cropland Remaining Cropland, 1990-1992	7-14
Figure 7-5: Net C Stock Change for Mineral Soils in Cropland Remaining Cropland, 1993-2004	7-14
Figure 7-6: Net C Stock Change for Organic Soils in Cropland Remaining Cropland, 1990-1992	7-15
Figure 7-7: Net C Stock Change for Organic Soils in Cropland Remaining Cropland, 1993-2004	7-15
Figure 7-8: Net C Stock Change for Mineral Soils in Land Converted to Cropland, 1990-1992	7-26
Figure 7-9: Net C Stock Change for Mineral Soils in Land Converted to Cropland, 1993-2004	7-26
Figure 7-10: Net Soil C Stock Change for Mineral Soils in Grassland Remaining Grassland, 1990-1992	7-29
Figure 7-11: Net Soil C Stock Change for Mineral Soils in Grassland Remaining Grassland, 1993-2004	7-29
Figure 7-12: Net Soil C Stock Change for Organic Soils in Grassland Remaining Grassland, 1990-1992	7-29
Figure 7-13: Net Soil C Stock Change for Organic Soils in Grassland Remaining Grassland, 1993-2004	7-29
Figure 7-14: Net Soil C Stock Change for Mineral Soils in Land Converted to Grassland, 1990-1992	7-34
Figure 7-15: Net Soil C Stock Change for Mineral Soils in Land Converted to Grassland, 1993-2004	7-34
Figure 8-1: 2004 Waste Chapter Greenhouse Gas Sources	8-1

## **Boxes**

Box ES- 1: Recalculations of Inventory Estimates	ES-1
Box ES-2: Recent Trends in Various U.S. Greenhouse Gas Emissions-Related Data	ES-15

Box 1-1: The IPCC Third Assessment Report and Global Warming Potentials	1-7
Box 1-2: IPCC Reference Approach	1-11
Box 2-1: Recent Trends in Various U.S. Greenhouse Gas Emissions-Related Data	2-3
Box 2-2: Methodology for Aggregating Emissions by Economic Sector	2-28
Box 2-3: Sources and Effects of Sulfur Dioxide	2-30
Box 3-1: Weather and Non-Fossil Energy Effects on CO <sub>2</sub> from Fossil Fuel Combustion Trends	3-5
Box 3-2: Carbon Intensity of U.S. Energy Consumption	3-11
Box 3-3: Formation of CO <sub>2</sub> through Atmospheric CH <sub>4</sub> Oxidation	3-67
Box 4-1: Potential Emission Estimates of HFCs, PFCs, and SF <sub>6</sub>	4-69
Box 6-1. Tier 1 vs. Tier 3 Approach for Estimating N <sub>2</sub> O Emissions	6-25
Box 8-1: Biogenic Emissions and Sinks of Carbon	8-5

